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Abstract

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Grant Number: 5R01NR004905-02
PI Name: MOORE, IDA M.
PI Title: PROFESSOR
Project Title: MATH INTERVENTION FOR CHILDREN WITH LEUKEMIA

Abstract: *The purpose of this study is to test a math intervention for children diagnosed with acute lymphoblastic leukemia (ALL) who receive triple intrathecal chemotherapy and systemic intermediate dose methotrexate according to Pediatric Oncology Group (POG) protocols. Despite increasing evidence of academic difficulties in children successfully treated for ALL, there are no reports of intervention studies. The primary aim of this study is to determine if a math intervention can prevent a significant decline in math achievement in children with ALL who receive triple intrathecal therapy and systemic intermediate dose methotrexate. One hundred and twenty children (4-10 years of age) with ALL recruited from two POG institutions will be randomly assigned to Standard Care or to a Math Intervention. It is hypothesized that there will be a greater decline in math achievement scores in the Standard Care group than in the Math Intervention group. The second aim is to determine the nature of the decline in math skills associated with triple intrathecal therapy. Three classes of variables will be examined: (1) The concentration of four phospholipids in cerebral spinal fluid (CSF): sphingomyelin, phosphatidylcholine, lysophosphatidylcholine and cardiolipin; (2) Other cognitive abilities that may be related to math achievement; and (3) Characteristics of the child: age at time of diagnosis, sex, number of school absences, socioeconomic status and baseline performance on academic and cognitive measures. A longitudinal prospective design with four evaluations of math and language achievement and cognitive abilities is proposed. The concentration of phospholipids, a biological marker of CNS injury, will be measured in CSF samples collected when lumbar punctures are done for intrathecal therapy. A comparison group of healthy children will be included to provide an estimate of the effects of repeated testing and to estimate losses in cognitive abilities associated with ALL treatment. Data will be*

analyzed in a two-step process aimed at developing measurement models and output will be used in subsequent analyses, including structural equation models. Measurement models will be established by confirmatory factor analysis. Child Characteristics will also be evaluated (as moderator variables). Individual growth curves for each child will be used in models. Long-term disease free survival from ALL is 80% because of aggressive systemic and CNS therapy. Pediatric oncology nurses manage acute and long-term toxicities of treatment. The proposed study addresses the cognitive and academic sequelae associated with CNS treatment, and to our knowledge is the first randomized intervention trial designed to prevent minimize math deficits in children receiving ALL treatment.

Thesaurus Terms:
academic achievement, acute lymphocytic leukemia, human therapy evaluation, mathematics, remedial /special education
age difference, cognition, drug adverse effect, gender difference, mathematical ability, socioeconomics
child (0-11), clinical research, human subject

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